AMENDMENTS TO THE SPECIFICATION

Please amend the specification as follows:

Please replace the paragraph on page 7, lines 20-30, with the following amended paragraph:

The disk substrate manufactured by the process described above provides the disk substrate as shown in Fig. 2 (e) which is used for an original disk substrate to make a disk stamper for mass production of an optical disk. For example, a transparent plastic disk plate is molded by such ~~the~~ a disk stamper manufactured from the disk substrate, then a first dielectric layer, an intermediate layer, a recording layer, a second dielectric layer, a reflection layer and a protection layer are build-up onto such the disk plate to form a phase change optical disk.

Please replace the paragraph on page 7, lines 31-34, with the following amended paragraph:

However, an optical disk formed by such ~~the~~ a disk stamper may have a pit jitter element caused by varied shape (step-shaped as described above) of the pit in long direction formed in the disk substrate.

Please replace the paragraph on page 8, lines 6-8, with the following amended paragraph:

The present invention provides a manufacturing method for a disk substrate to obtain a pit having smooth shape of an orifice portion in a quartz glass substrate.

Please replace the paragraph on page 8, lines 9-17, with the following amended paragraph:

The disk substrate in accordance with the present invention applies to the DVD-RW. The disk substrate is provided with a pit "p1" having a first depth h1 in the pit area (which area is also indicated as "Readable Emboss" as shown in Fig. 1) contiguous to the

end portion in the lead-in area at the inner circumference of the disk substrate, and with a groove "g1" having a second depth h2 (h1>h2) in the data area subsequent to the lead-in area in concentric ~~circle~~ circles or spirally.

Please replace the paragraph on page 8, lines 24-33, with the following amended paragraph:

Figs. 5 (a) through (e) are cross-sectional views of a disk substrate according to an embodiment of the present invention. In Fig. 5 (a), a disk substrate is composed of a resist layer 2 and a glass substrate such as a quartz glass 1. A quartz glass 1 is ~~whetted~~ coated by Cerium Oxide and applied with an adhesive by vaporizing process, then a resist layer 2 is coated on the quartz glass 1 with a thickness "r" and baked. The surface of the resist layer 2 is exposed by a cutting laser to form a pit "p1" and a groove "g1".

Please replace the paragraph on page 10, lines 14-21, with the following amended paragraph:

The resist layer 2 to be put on the quartz glass 1 should not be ~~deform~~ deformed even when the temperature rises over 110 to 130°c. The thickness of the quartz glass 1 is in the range of 1 mm to 6 mm. This range is preferably set for cooling efficiency of a cathode, and for having anisotropic structure. Otherwise, the thickness of layer will be thinner and the orifice portion of the pit may become wider in the first ashing process.

Please replace the paragraph on page 10, lines 21-36, with the following amended paragraph:

The difference between the pit and the groove fully exposed after photofinishing should be in the range of 30 to 60 nm for the cutting in the first process described above, or otherwise the resist layer is damaged so that the desirable resist pattern can not be obtained after the first etching in CHF_3.

Please replace the paragraph on page 11, lines 4-18, with the following amended paragraph:

The first ashing in the third process should be conducted by using ~~the~~ power ~~not to~~ that will not make the heat deformation of the resist pattern, and not to have the layer thickness bigger and not to have the orifice portion become wider. The condition is that the volume mixing ratio of $Ar/(Ar+O_2)$ is 10 to 90% and the gas pressure less than 2 Pa with the power less than 0.25 W/cm^2. The second etching in the fifth process is conducted under the same condition as the first etching but ~~such~~ so that the etching is conducted for the predetermined groove depth. The second (last) ashing is for cleaning the resist layer so the gas pressure can be more than 7 Pa with the power more than 0.22 W/cm^2.

Please replace the paragraph on page 11, lines 21-29, with the following amended paragraph:

(1) In order to avoid heat deformation of a resist pattern, the first ashing is preferably conducted with the quartz glass having the thickness of 1 mm to 6 mm which has high cooling efficiency of a cathode. The gas for ashing should be mixed with Oxygen and Argon (as an inert gas) in ~~voluminal~~ a volume mixing ratio of $Ar/(Ar+O_2)$ of 10 to 90% so that the anisotropy of the ashing increases. The condition of ashing should be below 2 Pa in gas pressure with the power less than 0.25 W/cm^2.

Please replace the paragraph on page 11, lines 30-35, with the following amended paragraph:

(2) A material for the resist layer to be applied to the quartz glass resist heat which prevents deformation of the resist pattern under the first etching and first ashing. For example, the material for the resist layer is composed of Novolac resin which solvent is Ethyl-cellosolve-acetate.

Please replace the paragraph on page 12, lines 9-16, with the following amended paragraph:

As shown in Figs. 1 and 2 (a) through 2 (e), a pit "p1" having a first depth h1 is formed in a pit area contiguous to the end portion of lead-in area in the inner circumference of disk substrate, and a groove "g1" having a second depth h2 (h1>h2) is formed in a data area subsequent to the lead-in area in concentric ~~circle~~ circles or spiral shape on the disk substrate. The disk substrate is manufactured by following processes.

Please replace the paragraph on page 12, lines 17-32, with the following amended paragraph:

(1) As shown in Fig. 5 (a), a disk substrate having a diameter of 240 mm and a thickness of 6 mm made of quartz glass 1 is ~~whetted~~ coated with Cerium Oxide and vaporized with hexamethyldisilazane ($(CH_3)_3SiNHSi(CH_3)_3$) as an adhesive. Then a photoresist called "TSMRV3" (a product of Tokyo Ohka Kogyo Ltd.) is applied to the quartz glass 1 with a thickness of 100 nm, and baked for 40 minutes in 90°c. A cutting laser is exposed to the surface of the resist layer 2 and a pit "p1" and a groove "g1" are obtained. The pit "p1" is cut deeper than the groove "g1" that the surface of quartz glass 1 is exposed while the groove "g1" is half cut in the resist layer. The cutting of the pit and the groove applies to the DVD-RW format ver. 1.1. The depth h1 of the pit "p1" is 100 nm and the depth of the groove "g1" is 70 nm which difference is 30 nm.

Please replace the paragraph on page 13, lines 27-33, with the following amended paragraph:

As a result, the pit "p1" having the first depth h1 is formed in the pit area contiguous to the end portion of the lead-in area at inner circumference of the disk substrate. Further, the groove "g1" having the second depth h2 (h1>h2) is formed in the data area subsequent to the lead-in area, in concentric ~~circle~~ circles or a spiral, of the disk substrate.

Please replace the paragraph on page 14, line 23 and continuing onto page 15, line 4, with the following amended paragraph:

The disk substrate having binary depth of pit and/or groove is formed in 240 mm diameter quartz glass, and is manufactured by the processes described above will be used as a disk master and will be used for manufacturing a disk stamper. The disk stamper will be used for molding transparent plastic disk ~~plate~~ plates. The disk plate is build-up with a first dielectric layer, an intermediate layer, a recording layer, a second dielectric layer, a reflection layer and a protection layer to construct a phase change optical disk. As the pit jitter element is suppressed by the manufacturing processes of the disk substrate described above, a varied shape of the pit can be suppressed in the disk plate formed by a disk stamper manufactured by the disk substrate. Accordingly, an optical disk manufactured by accumulating various layers on the disk plate as described above, can properly be reproduced by an optical disk player.

Please replace the paragraph on page 15, lines 5-11, with the following amended paragraph:

More specifically, the disk stamper is formed by Nickel electrotyping, and centering the disk master manufactured from the disk substrate having block-rectangular shaped pit and groove which pit has the depth of 95 nm and groove has the depth of 25 nm. In addition, a plurality of disk ~~stamper~~ stampers can be duplicated from the quartz glass master.

Please replace the paragraph on page 15, lines 12-14, with the following amended paragraph:

The disk stamper is used as a casting mold for manufacturing a large quantity of transparent plastic disk ~~substrate~~ substrates.

Please replace the paragraph on page 16, lines 7-20, with the following amended paragraph:

Eventually, the inside wall of the pit for the disk substrate can be obtained in a smooth block-rectangular shape. Consequently, the disk substrate is used for making a disk stamper to manufacture disk ~~substrate~~ substrates for phase change optical ~~disk~~ disks. The disk substrate is build-up with various layers such as the first dielectric layer, the intermediate layer, the recording layer, the second dielectric layer, the reflection layer and protection layer. As the inside wall of the pit of the disk substrate is formed smoothly, the pit jitter element as described above can be suppressed for the optical disk manufactured by the disk stamper formed by such the disk substrate that the optical disk can be reproduced properly by the optical disk player.